weight species of hyaluronic acid in porous foam form. In still another embodiment, the construct includes a biomaterial comprised of HA molecules ranging in size from 5.1 kDA to $>2\times10^6$ kDa. In yet another embodiment, the construct includes a biomaterial comprised of a poly-lactic acid-based foam having pores of between about 50 microns to about 300 microns. In still another embodiment, the construct includes one or more cell populations derived from an autologous kidney sample. In one embodiment, the kidney sample is a kidney biopsy. In a further embodiment, the construct includes one or more cell populations derived from a non-autologous kidney sample. In one embodiment, the construct provides erythroid homeostasis.

[0025] In yet another aspect, the invention provides a method of treating a kidney disease in a subject in need, comprising: a) administering to the subject a composition comprising an admixture of mammalian renal cells comprising a first cell population, B2, and a second cell population; and b) determining in a test sample from the subject that the level of a kidney function indicator is different relative to the indicator level in a control, wherein the difference in indicator level is indicative of a reduction in decline, a stabilization, or an improvement of one or more kidney functions in the subject. In certain embodiments, the methods include an admixture of cells comprising a third cell population. In one embodiment, the second cell population is B4 or B3. In another embodiment, the third cell population is B4 or B3. In certain embodiments, the kidney disease to be treated by the methods of the invention is accompanied by an erythropoietin (EPO) deficiency. In certain embodiments, the EPO deficiency is anemia. In some embodiments, the EPO deficiency or anemia occurs secondary to renal failure in the subject. In some other embodiments, the EPO deficiency or anemia occurs secondary to a disorder selected from the group consisting of chronic renal failure, primary EPO deficiency, chemotherapy or anti-viral therapy, non-myeloid cancer, HIV infection, liver disease, cardiac failure, rheumatoid arthritis, or multi-organ system failure. In certain embodiments, the composition used in the method further comprises a biomaterial comprising one or more biocompatible synthetic polymers and/or naturally-occurring proteins or peptides, wherein the admixture is coated with, deposited on or in, entrapped in, suspended in, embedded in and/or otherwise combined with the biomaterial.

[0026] In yet another aspect, the invention provides a use of the cell preparations and admixtures thereof or an implantable construct of the instant invention for the preparation of a medicament useful in the treatment of a kidney disease, anemia or EPO deficiency in a subject in need thereof.

[0027] In one aspect, the instant invention provides a selected population of renal cells, isolatable by centrifugation through a density gradient, after having been exposed to about 1% to about 5% oxygen levels for about 12 to about 24 hours, with the gradient including a portion with density from about 1.045 g/mL to about 1.052 g/mL, wherein the cell population (i) is retained in the gradient after centrifugation at a density between 1.045 g/mL to about 1.052 g/mL, (ii) comprises a renal tubular cell population characterized by expression of at least one tubular cell marker, (iii) comprises a subpopulation of renal tubular cells capable of receptor-mediated albumin transport, (iv) is capable of modulating one or more renal functions when delivered to a subject at risk of or having a renal disease.

[0028] In yet another aspect, the instant invention provides a selected population of renal cells, isolatable by centriguation through a density gradient, after having been exposed to about 1% to about 5% oxygen levels for about 12 hours to about 24 hours, with the gradient including a portion with density from about 1.063 g/mL to about 1.091 g/mL, wherein the cell population (i) is retained in the gradient after centrifugation, at a density between 1.063 g/mL to about 1.091 g/mL, (ii) comprises oxygen-tunable erythropoietin (EPO)-expressing cells, glomerular cells, and vascular cells, (iii) is capable of modulating one or more renal functions when delivered to a subject at risk of or having a renal disease, and (iv) is capable of enhancing the modulation of one or more renal functions by the population of renal cells of claim **65** upon co-administration.

[0029] In still another aspect, the instant invention provides a population of renal cells that, wherein the cells have been: i) placed into adherent culture on standard tissue-culture-treated plastic dishes at an initial density of 25,000 cells/cm^2, in a media consisting of a 1:1 mixture of High-Glucose DMEM and fully-supplemented KSFM, with 5% fetal bovine serum, at 37° C. and 21% oxygen for a period of 24-72 hours; ii) subjected to a 50-100% media change with the same media and cultured for 18-24 hours at 37° C. and 2% oxygen; iii) harvested via trypsinization, resuspended, and washed with serum-free KSFM media or PBS; iv) loaded onto a prepared density gradient, said gradient containing a layer with a defined density between 1.045 g/mL to about 1.052 g/mL and containing at least one layer of greater density and at least one layer of lesser density, whereby the gradient has been prepared in a 15 mL conical tube in a total liquid volume of not less than 5 and not more than 14 mL, and the number of cells loaded onto the gradient is at least 50 million but does not exceed 100 million; v) forced through the gradient by centrifugation at 800× G for 20-30 minutes with no brake; and segmented at a density between 1.045 g/mL and 1.052 g/mL; and/or is characterized by a marker selected from the group consisting of megalin, cubilin, hyaluronic acid synthase 2 (HAS2), Vitamin D3 25-Hydroxylase (CYP2D25), N-cadherin (Ncad), E-cadherin (Ecad), Aquaporin-1 (Aqp1), Aquaporin-2 (Aqp2), RAB17, member RAS oncogene family (Rab17), GATA binding protein 3 (Gata3), FXYD domain-containing ion transport regulator 4 (Fxyd4), solute carrier family 9 (sodium/hydrogen exchanger), member 4 (S1c9a4), aldehyde dehydrogenase 3 family, member B1 (Aldh3b1), aldehyde dehydrogenase 1 family, member A3 (Aldh1a3), Calpain-8 (Capn8), and Aquaporin-4 (Aqp4) marker; and/or is capable of stabilizing, reducing the decline, or improving one or more renal functions in an immunocompatible subject that has renal disease.

[0030] In still another aspect, the instant invention provides a population of renal cells that, wherein the cells have been: i) placed into adherent culture on standard tissue-culture-treated plastic dishes at an initial density of 25,000 cells/cm^2, in a media consisting of a 1:1 mixture of High-Glucose DMEM and fully-supplemented KSFM, with 5% fetal bovine serum, at 37° C. and 21% oxygen for a period of 24-72 hours; ii) subjected to a 50-100% media change with the same media and cultured for 18-24 hours at 37° C. and 2% oxygen; iii) harvested via trypsinization, resuspended, and washed with serum-free KSFM media or PBS; iv) loaded onto a prepared density gradient, said gradient containing a layer with a defined density between 1.063 g/mL to about 1.091 g/mL and containing at least one layer of greater density and at least one